Claims

1.   A moving image encoding apparatus which separates one moving image sequence to a lower layer having a low frame rate and an upper layer having a high frame rate, encodes a shape of a parts area for synthesizing said lower layer, on the condition that there is no frame of the lower layer corresponding to the upper layer, and encodes the upper layer by prediction, wherein

when the parts area of the lower layer appearing as a background is larger than a predetermined threshold, the moving image encoding apparatus encodes the shape of the parts area, and synthesizes a frame obtained by taking the average by weighting the lower layer and a frame of the lower layer to generate image information, and when said parts area of the lower layer appearing as a background is smaller than the predetermined threshold, the moving image encoding apparatus does not encode the shape of the. parts area and generates image information by the weighted average of the lower layer.

2.   A moving image decoding apparatus which synthesizes a lower layer having a low frame rate, on the condition that there is no frame corresponding to an upper layer having a high frame rate, decodes said upper layer by prediction, and superimposes said prediction-decoded upper layer on said

lower layer to decode them into one moving image sequence, wherein

when the shape of a parts area has been encoded, the moving image decoding apparatus decodes the shape of said

5   parts area, and synthesizes a frame obtained by taking the average by weighting the lower layer and a frame of the lower layer to generate image information, and when the shape of parts area has not been encoded, the moving image decoding apparatus generates said image information by the weighted

10   average of the lower layer.

3.   A moving image encoding apparatus which separates one moving image sequence to a lower layer having a low frame rate and an upper layer having a high frame rate, encodes

15   a shape of a parts area for synthesizing said lower layer, on the condition that there is no frame of the lower layer corresponding to the upper layer, and encodes the upper layer by prediction, wherein

the moving image encoding apparatus interpolates a

20   pixel value within the overlapping area of the lower layer, using a pixel value in the periphery of the area appearing as a background, to generate image information.

4.   A moving image decoding apparatus which synthesizes

25   a lower layer having a low frame rate, on the condition that

there is no lower layer frame corresponding to an upper layer having a high frame rate, decodes said upper layer by prediction, and superimposes said prediction-decoded upper layer on said lower layer to decode them into one moving image

5   sequence, wherein

the moving image decoding apparatus interpolates a pixel value within the overlapping area, using a pixel value in the periphery of the overlapping area of the parts area of the lower layer appearing as a background, to generate

10   image information.

5.   A moving image encoding apparatus according to claim 1, wherein the pixel value within said parts area is interpolated by using a pixel value in the periphery of the

15   parts area of the lower layer, and image information is generated by using the interpolated lower layer frame.

6.   A moving image decoding apparatus according to claim 2, wherein the pixel value within said parts area is

20   interpolated by using a pixel value in the periphery of the parts area of the lower layer, and image information is generated by using the interpolated lower layer frame.

7.   A moving image encoding apparatus according to claim

25   1, wherein

in the case where the number of frames of the lower layer required for the synthesis of the lower layer is not satisfied, the image information is generated by using a frame obtained by interpolating the parts area of said lower layer.

8.   A moving image decoding apparatus according to claim 2, wherein

in the case where the number of frames of the lower layer required for the synthesis of the lower layer is not satisfied, the image-information is generated by using a frame obtained by interpolating the parts area of the lower layer.

9.   A moving image encoding apparatus according to claim 1, wherein

in the case where there are a plurality of frames of the upper layer between two adjacent frames of the lower layer, when the parts area of the lower layer appearing as a background of any one of the plurality of frames of the upper layer is larger than the predetermined threshold, the shape of the parts area for synthesizing the lower layer frame is encoded with respect to said plurality of the upper layer frames.

10.   A moving image encoding apparatus according to claim 3, wherein

in the case where there are a plurality of frames of the upper layer between two adjacent frames of the lower layer, when the parts area of the lower layer appearing as a background of any one of the plurality of frames of the upper

5   layer is larger than the predetermined threshold, the shape of the parts area for synthesizing the lower layer frame is encoded with respect to said plurality of the upper layer frames.

10   11.   A moving image encoding apparatus according to claim 5, wherein

in the case where there are a plurality of frames of the upper layer between two adjacent frames of the lower layer, when the parts area of the lower layer appearing as a

15   background of any one of the plurality of frames of the upper layer is larger than the predetermined threshold, the shape of the parts area for synthesizing the lower layer frame is encoded with respect to said plurality of the upper layer frames.

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12.   A moving image encoding apparatus according to claim 7, wherein

in the case where there are a plurality of frames of the upper layer between two adjacent frames of the lower layer,

25   when the parts area of the lower layer appearing as a

background of any one of the plurality of frames of the upper layer is larger than the predetermined threshold, the shape of the parts area for synthesizing the lower layer frame is encoded with respect to said plurality of the upper layer frames.

13.   A moving image decoding apparatus according to claim 2, wherein

in the case where there are a plurality of frames of the upper layer between two adjacent frames of the lower layer, when the shape of the parts area for synthesizing the said lower layer frame is encoded with respect to any one of said plurality of frames of the upper layer, a frame obtained by taking the average by weighting the lower layer and a frame of the lower layer are synthesized with respect to all of the plurality of frames of the upper layer to generate image information.

14.   A moving image decoding apparatus according to claim 4, wherein

in the case where there are a plurality of frames of the upper layer between two adjacent frames of the lower layer, when the shape of the parts area for synthesizing the said lower layer frame is encoded with respect to any one of said plurality of frames of the upper layer, a frame obtained by

taking the average by weighting the lower layer and a frame
of the lower layer are synthesized with respect to all of
the plurality of frames of the upper layer to generate image
information.

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15.   A moving image decoding apparatus according to claim
6, wherein

in the case where there are a plurality of frames of
the upper layer between two adjacent frames of the lower layer,
10   when the shape of the parts area for synthesizing the said
lower layer frame is encoded with respect to any one of said
plurality of frames of the upper layer, a frame obtained by
taking the average by weighting the lower layer and a frame
of the lower layer are synthesized with respect to all of
15   the plurality of frames of the upper layer to generate image
information.

16.   A moving image decoding apparatus according to claim
8, wherein
20   in the case where there are a plurality of frames of
the upper layer between two adjacent frames of the lower layer,
when the shape of the parts area for synthesizing the said
lower layer frame is encoded with respect to any one of said
plurality of frames of the upper layer, a frame obtained by
25   taking the average by weighting the lower layer and a frame

of the lower layer are synthesized with respect to all of the plurality of frames of the upper layer to generate image information.

5   17.   A moving image encoding apparatus according to claim 1, wherein

        when the parts area of the lower layer appearing as a background is smaller than the predetermined threshold, the parts area of the upper layer is expanded by using the

10   parts area of the lower layer to generate a parts area of image information.

        18.   A moving image encoding apparatus according to claim 3, wherein

15   when the parts area of the lower layer appearing as a background is smaller than the predetermined threshold, the parts area of the upper layer is expanded by using the parts area of the lower layer to generate a parts area of image information.

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        19.   A moving image encoding apparatus according to claim 5, wherein

        when the parts area of the lower layer appearing as a background is smaller than the predetermined threshold,

25   the parts area of the upper layer is expanded by using the

parts area of the lower layer to generate a parts area of image information.

20.   A moving image encoding apparatus according to claim 7, wherein

when the parts area of the lower layer appearing as a background is smaller than the predetermined threshold, the parts area of the upper layer is expanded by using the parts area of the lower layer to generate a parts area of image information.

21.   A moving image encoding apparatus according to claim 9, wherein

when the parts area of the lower layer appearing as a background is smaller than the predetermined threshold, the parts area of the upper layer is expanded by using the parts area of the lower layer to generate a parts area of image information.

22.   A moving image encoding apparatus according to claim 10, wherein

when the parts area of the lower layer appearing as a background is smaller than the predetermined threshold, the parts area of the upper layer is expanded by using the parts area of the lower layer to generate a parts area of

image information.

23.   A moving image encoding apparatus according to claim
11, wherein

when the parts area of the lower layer appearing as
a background is smaller than the predetermined threshold,
the parts area of the upper layer is expanded by using the
parts area of the lower layer to generate a parts area of
image information.

24.   A moving image encoding apparatus according to claim
12, wherein

when the parts area of the lower layer appearing as
a background is smaller than the predetermined threshold,
the parts area of the upper layer is expanded by using the
parts area of the lower layer to generate a parts area of
image information.

25.   A moving image decoding apparatus according to claim
2, wherein

when the lower layer frame is synthesized, a pixel
value of one of the lower layer frames which exist front and
behind of a frame of the lower layer is used, with respect
to an area where the first parts area and the second parts
area overlap, or an area which is neither the first parts

area nor the second parts area.

26.   A moving image decoding apparatus according to claim 6, wherein

when the lower layer frame is synthesized, a pixel value of one of the lower layer frames which exist front and behind of a frame of the lower layer is used, with respect to an area where the first parts area and the second parts area overlap, or an area which is neither the first parts area nor the second parts area.

27.   A moving image decoding apparatus according to claim 2, wherein

when the lower layer frame is synthesized, a pixel value of one of the lower layer frames which exist front and behind of a frame of the lower layer is used, with respect to an area where the first parts area and the second parts area overlap, or an area which is neither the first parts area nor the second parts area, and at the time of the synthesis, interpolation is performed by using a pixel value of a frame of said lower layer with respect to a pixel value outside of one parts area of the lower layer, and using a pixel value in the periphery of said parts area with respect to a pixel value inside of said one parts image of the lower layer.

28.   A moving image decoding apparatus according to claim 4, wherein

when the lower layer frame is synthesized, a pixel value of one of the lower layer frames which exist front and behind of a frame of the lower layer is used, with respect to an area where the first parts area and the second parts area overlap, or an area which is neither the first parts area nor the second parts area, and at the time of the synthesis, interpolation is performed by using a pixel value of a frame of said lower layer with respect to a pixel value outside of one parts area of the lower layer, and using a pixel value in the periphery of said parts area with respect to a pixel value inside of said one parts image of the lower layer.

29.   A moving image decoding apparatus according to claim 6, wherein

when the lower layer frame is synthesized, a pixel value of one of the lower layer frames which exist front and behind of a frame of the lower layer is used, with respect to an area where the first parts area and the second parts area overlap, or an area which is neither the first parts area nor the second parts area, and at the time of the synthesis, interpolation is performed by using a pixel value of a frame of said lower layer with respect to a pixel value

outside of one parts area of the lower layer, and using a
pixel value in the periphery of said parts area with respect
to a pixel value inside of said one parts image of the lower
layer.

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30.   A moving image decoding apparatus according to claim
25, wherein

when the lower layer frame is synthesized, a pixel
value of one of the lower layer frames which exist front and
10   behind of a frame of the lower layer is used, with respect
to an area where the first parts area and the second parts
area overlap, or an area which is neither the first parts
area nor the second parts area, and at the time of the
synthesis, interpolation is performed by using a pixel value
15   of a frame of said lower layer with respect to a pixel value
outside of one parts area of the lower layer, and using a
pixel value in the periphery of said parts area with respect
to a pixel value inside of said one parts image of the lower
layer.

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31.   A moving image decoding apparatus according to claim
26, wherein

when the lower layer frame is synthesized, a pixel
value of one of the lower layer frames which exist front and
25   behind of a frame of the lower layer is used, with respect

to an area where the first parts area and the second parts area overlap, or an area which is neither the first parts area nor the second parts area, and at the time of the synthesis, interpolation is performed by using a pixel value of a frame of said lower layer with respect to a pixel value outside of one parts area of the lower layer, and using a pixel value in the periphery of said parts area with respect to a pixel value inside of said one parts image of the lower layer.